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Urgency and motives to reduce energy consumption in historic buildings

Maarten Vieveen does research on adaptive reuse and energy efficiency in historic buildings at Area Development Research Centre NoorderRuimte of the Hanze University of Applied Sciences. His presentation focuses on the urgency of reducing energy use in historic buildings and why owners of historic buildings are (not) willing to modify their historic building.

BY MAARTEN VIEVEEN (HANZE UNIVERSITY OF APPLIED SCIENCES, GRONINGEN)

Introduction

The two-year project on energy efficient restoration focused in general on finding solutions for reducing energy consumption and improving thermal comfort while preserving historic qualities of historic buildings. One of the research teams was called *Energy efficient redevelopment of historic buildings*. During sessions this research team discussed the urgency of reducing energy consumption. Instead of reducing energy consumption compared to 1990-levels, as enshrined in international agreements, the Dutch have increased their energy consumption by 10% in the last ten years (CBS 2013). Even so, it was questioned why we should improve the energy efficiency of historic buildings, since they only make up a small percentage of our built environment. Or is it an urgent matter in the context of preserving heritage qualities? Also, it was questioned if and why owners are (not) willing to modify their historic building.

Methodology

First the perceived need for reducing energy consumption in historic buildings was researched by doing a survey among 40 committees that manage the use of historic churches. About 21 committees responded. In addition archival research into these churches was carried out.

Data was collected on the size of the building, the operating expenses (energy costs, rental charges/mortgage costs) in the years 2009-2012 and the number and character of activities that took place in these years.

Secondly, the willingness of owners to modify their historic building was inventoried by conducting interviews. Topics included motives for acquiring and using a historic building, and willingness and plans to modify the building. Based on a study by Brand (1994) it is expected that differences might occur based on the interests of the type of owner.[2]

1. Architects, energy consultants, real estate managers, and other experts like a lawyer and a psychologist.
2. Commercial organisations, non-profit organisations, and individual private owners of historic buildings. Commercial organisations might be interested in making money or improving the image of the company. Non-profit organisations might have a common interest in preserving heritage qualities. Private house owners might be interested in living quality such as beauty and thermal comfort.

Urgency for reducing energy consumption in historic buildings

In order to answer the question whether reducing energy consumption in historic buildings is seen as urgent, data from 35 historic buildings was collected (2012-2013). We present the preliminary results of the first analysis of 27 historic buildings, including 21 churches in the province of Groningen, and 6 other buildings in the provinces of Groningen, Drenthe and Fryslân.

To position the urgency of reducing energy consumption in historic buildings we compared the energy consumption costs and rental/mortgage costs of common Dutch residential buildings: in non-historic buildings 33% of the total costs for energy and rental/mortgage is spent on energy costs (CBS 2013). For historic buildings the analysis shows that on average 41% was spent on energy. When dividing the cases into churches and other buildings, in churches 57% was spent on energy, as opposed to 22% in historic buildings. In some churches the energy costs were about 65-90%. The absolute amount of money spent on energy use (in euros) for other historic buildings is 3.5 times higher than for churches. Some owners of these other historic buildings mentioned that continued use (and preservation) of the historic building was uncertain due these high energy costs.

Conclusion (A)

Based on these findings it was (preliminary) concluded that reducing energy consumption in historic buildings is an urgent matter.

Motives of owners for (not) willing to modify their historic building

To provide insight into the motives for (not) being willing to reduce energy consumption about 15 owners of historic were interviewed. Starting with a network session the first interviewees were approached for an interview. The other interviewees were approached by snowball sampling. Based on Brand (1994) we assumed that there might be differences in motives among different types of owners since they might have different interests, for example a different scope for the Return of Investment. Therefore a comparable amount of different types of owners were interviewed.

Motives for acquiring and using a historic building

It was found that for all types of owners heritage qualities and a safe investment over time were important motives to acquire and use a historic building. For commercial organisations and individual private owners location was also important and non-profit organisations stated that the acquisition of a historic building was also prompted by the wish to contribute to society by preserving a historic building.

Opinions regarding modification of historic buildings

Opinions about modification of commercial and non-profit organisations were comparable. The current activities of the organisation were slightly more important than preserving heritage qualities. Heritage qualities were described as an added value: for commercial organisations because of the image of the company, for non-profit organisations because of their contribution to society, and for individual private owners because of the beauty and history.

Motives for considering energy measures

When asked about the motives for energy measures all types of owners stated that reducing energy expenses was an urgent matter. The non-profit (and some commercial) organisations and private owners added that image was an added value, for example because of their internal policy to be more sustainable.

Leegkerks' church
www.dagvandearchitectuur
groningen.nl 2014;
Bijzondere Locaties Groningen 2014.

Motives for nót considering energy measures

Motives for not taking energy measures partly originated in uncertainties about the effects of energy measures, for example:

- *Heritage vs. Use:* How are values like heritage qualities and user quality weighed by the authorities? (Insight in values/transparency and refined detailing).
- *Investment:* What is the Return of Investment of energy measures? An owner of a commercial organisation brought forward that his accountant was of the opinion that the amount of money spent on energy consumption could lead to questions if the operation of enterprise was future proof.
- *Image for preservation:* A commercial organisation brought forward that the image of the company (internal policy) also leads to not taking energy measures, our main goal is to preserve heritage qualities of historic buildings. Modifying these buildings contradicts our main goal so owners accept high energy costs.
- *Trust in companies:* a private owner addressed uncertainty about guarantees and services of companies. What are best practices? What if the proposed measures do not work out as the company presented? Will I be accepted as a serious participant in the design process?
- *Insight financial support:* a private owner assumed that insight in subsidies for energy measures of sustainable monuments might get him more motivated for taking energy measures.
- *Reducing energy consumption is not considered as a priority*: One private owner stated that he did not implement energy measures, but it turned out that he had implemented a large variety of possible energy measures, simply to improve thermal comfort. Also other interviewees addressed improving thermal comfort as an important motive to start exploring possibilities to reduce energy consumption.

Conclusion (B)

Based on the (preliminary) results of the interviews we conclude that motives for living in a historic building basically originate in the heritage qualities. Modifying the historic building is legitimate when adding value or improving the use of the historic building. However, preserving heritage qualities is important since these were the main motive for acquiring and using a historic building. In the first place it turned out that taking energy measures was based on sustainable development and lowering energy costs. Secondly it seemed that by focusing on themes like trust, financial support and raising thermal comfort, (especially individual private) owners may become more motivated to consider energy measures.

During the interviews, all owners pointed out that transparency in weighting of values by heritage specialists, the return on investment and refined detailing were important aspects that influenced their decisions regarding energy measures.

References

Brand, S. (1994); *How buildings learn*, what happens after they're built; Viking Press, New York; ISBN: 0-670-83515-3.

CBS (2013); *Energiebalans*, kerncijfers (sector particuliere huishoudens); geraadpleegd 22 maart 2013, www.statline.nl.